



## **60V Triple Output, 29 $\mu$ A I<sub>Q</sub> Buck/Buck/Boost DC/DC Controller Maintains Regulation in Automotive & Heavy Truck Start/Stop Systems**

MILPITAS, CA – March 2, 2015 – Linear Technology Corporation announces the [LTC3899](#), a triple output (buck, buck, boost) 29 $\mu$ A quiescent current, synchronous DC/DC controller that maintains output voltage regulation over a 2.2V to 60V input range. A 12V car battery can droop to less than 4 volts during engine restart or cold crank, causing reset of infotainment systems and other electronics that operate from 5 volts and higher. The boost converter feeds two step-down converters, avoiding output voltage dropout when a car battery droops, a useful feature in automotive start/stop systems that shut off the engine at idle to save fuel. The 60V maximum input voltage covers double battery truck applications. Alternatively, the buck controllers can be powered from the input as a general purpose triple output controller.

The LTC3899 operates from an input voltage of 4.5V to 60V during start-up and maintains operation down to 2.2V after start-up. The boost and buck converters can produce output voltages up to 60V with efficiencies as high as 95%. In applications where the input voltage may exceed the regulated output voltage, the LTC3899 keeps the synchronous boost MOSFET on continuously so that the output voltage follows the input voltage with minimal power loss.

In addition, the LTC3899 can be configured for Burst Mode<sup>®</sup> operation, reducing quiescent current to 29 $\mu$ A for one channel (39 $\mu$ A for all three channels on) with outputs in regulation in standby mode, a useful feature for preserving battery run times. The powerful 1ohm onboard all N-channel gate drivers minimize MOSFET switching losses and provide for output

currents of more than 10 amps per channel, limited only by external components. Furthermore, the output current for each converter can be sensed by monitoring the voltage drop across the inductor (DCR) or by using a sense resistor. The LTC3899's constant frequency current mode architecture enables a fixed frequency from 50kHz to 900kHz or it can be synchronized to an external clock from 75kHz to 850kHz. Additional features include an onboard LDO for IC power and gate drive, output voltage tracking or adjustable soft-start, a power good signal and an optional external V<sub>CC</sub> bias input.

The LTC3899 is available in 38-lead SSOP and 38-pin 5mm x 7mm QFN packages. Four temperature grades are available, with operation from –40 to 125°C for the extended and industrial grades, a high temp automotive grade of –40°C to 150°C and a military grade of –55°C to 150°C. The 1,000-piece price starts at \$4.95 each. For more information, visit [www.linear.com/product/LTC3899](http://www.linear.com/product/LTC3899)

**Photo Caption:** Triple Output Buck/Buck/Boost DC/DC Controller


### Summary of Features: LTC3899

- All Outputs Remain in Regulation During Engine Restart
- Wide Input Voltage Range: 4.5V to 38V During Start-Up, Down to 2.2V After Start-Up
- Boost Output Voltage Up to 60V
- Buck Output Voltage Range: 0.8V to 60V
- Low 29 $\mu$ A Quiescent Current During Standby Condition
- Up to 95% Efficiency
- Powerful Onboard All N-Channel Gate Drivers
- R<sub>SENSE</sub> or DCR Current Sensing
- Power Up/Down Tracking & Sequencing
- Current Mode Control
- Fixed Programmable Operating Frequency from 50kHz to 900kHz
- Synchronizable Operating Frequency from 75kHz to 850kHz
- Extended & Industrial Temp Grades: –40°C to 125°C Operating Junction Temp
- Automotive Temp Grade: –40°C to 150°C Operating Junction Temp
- Military Temp Grade: –55°C to 150°C Operating Junction Temp

The USA list pricing shown is for budgetary use only. International prices may differ due to local duties, taxes, fees and exchange rates.

### **About Linear Technology**

Linear Technology Corporation, a member of the S&P 500, has been designing, manufacturing and marketing a broad line of high performance analog integrated circuits for major companies worldwide for over three decades. The Company's products provide an essential bridge between our analog world and the digital electronics in communications, networking, industrial, automotive, computer, medical, instrumentation, consumer, and military and aerospace systems. Linear Technology produces power management, data conversion, signal conditioning, RF and interface ICs, µModule® subsystems, and wireless sensor network products. For more information, visit [www.linear.com](http://www.linear.com)

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